CS204: Algorithms & Data Structure Lab

Assignment – 2

Problem : Linked list of coordinate system.

Problem Statement

Create a linked list where each node contains x and y coordinates of a point. Implement the following functions:

1. AddFirst(a,b)

   This function adds a point containing ‘a’ as x-coordinate and ‘b’ as y-coordinate at the start of the linked list.

2. DelFirst()

   This function deletes the first element in the linked list.
   If it is not in the list or list is empty, print -1

3. Del (a,b)

   This function deletes the node with point containing ‘a’ as x-coordinate and ‘b’ as y-coordinate.
   If it is not in the list or list is empty, print -1

4. Search(d)

   This function gives all the points that are present at atmost ‘d’ distance (Euclidean) from the origin.
   If such points exist, print the number of such points.
   Else print -1

5. Search(a,b)

   This function prints True, if there exists a point with ‘a’ as x-coordinate and ‘b’ as y-coordinate in the linked list.
   Else it prints False

6. Length()

   This function prints the length of the linked list, i.e., the number of nodes present in the list.

Sample Input

```
12          //Number of operations to be performed.
1 30 24     // Here 1 represents the operation AddFirst(a,b). This adds (30,24) into the linked list.
1 19 62
1 13 43
1 53 30
1 61 38
1 65 73
2           // Here 2 represents the operation DelFirst(). This deletes the first node.
3 14 14     // Here 3 represents the operation  Del (a,b). This deletes the point (14,14)
3 13 43
5 53 30     // Here 5 represents the operation Search(a,b). This searches for point (53,30)
4 40        // Here 4 represents the operation Search(d), where distance d is 40.
6           // Here 6 represents the operation Length().
```

Sample Output

```
-1
 True
1
4
```
